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Attorney's Docket No.: 07977-264001 / US4594

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Yonezawa, et al. Art Unit : 1763
Serial No. : 09/777,280 Examiner : Luz L. Alejandro
Filed : February 5, 2001
Title : CONVEYOR DEVICE AND FILM FORMATION APPARATUS FOR A FLEXIBLE SUBSTRATE

MAIL STOP APPEAL BRIEF PATENTS
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BRIEF ON APPEAL

(1) Real Party in Interest

Semiconductor Energy Laboratory Co., Ltd., the assignee of this application, is the real party in interest.

(2) Related Appeals and Interferences

There are no related appeals or interferences.

(3) Status of Claims

Claims 1-15 are pending in this application, with claims 1, 3, 10 and 13 being independent. Claims 13-15 have been withdrawn from consideration. Claims 10 and 12 have been rejected as being anticipated by Brown (U.S. Patent No. 5,314,539), and claims 1-12 have been rejected as being unpatentable over Brown in view of admitted prior art and Misiano (U.S. Patent No. 5,462,602).

(4) Status of Amendments

The claims have not been amended subsequent to the final rejection dated August 18, 2003.

(5) Summary of Invention

The invention is directed to conveyor devices for conveying continuous flexible substrates for use, for example, in film formation. As shown in Fig. 3, formation of wrinkles in a

substrate 306 is prevented by using cylindrical rollers 304 arranged on an arc 301 such that center axes 305 of the rollers 304 are on the arc and parallel to a center axis 303 of the arc 301. A tensile force is applied to the substrate 306 so that the substrate is brought in close contact with the rollers. The rollers are arranged such that a wrap angle at which the substrate 306 contacts each roller 304 is kept positive. See the application at page 4, line 18 to page 5, line 7.

As illustrated in Fig. 5B, having a flexible substrate 512 contact rollers 511 with a positive wrap angle 508 causes a component force 506 to press the substrate against each of the rollers. When the rollers are also configured as electrodes, this permits the flexible substrate to be placed in close contact with the electrodes. See the application at page 6, lines 1-22.

As shown in Figs. 7A and 7B, this arrangement allows the system to obtain results comparable to those obtained using a cylindrical can method with a system that is substantially smaller in size than the system that implements the cylindrical can method. See the application at page 7, line 6 to page 8, line 2.

(6) Issues

A. Is the subject matter of claims 10 and 12 anticipated by Brown?

B. Would the subject matter of claims 1-9 have been obvious over Brown in view of the admitted prior art and further in view of Misiano?

C. Would the subject matter of claims 10-12 have been obvious over Brown in view of the admitted prior art and further in view of Misiano?

(7) Grouping of Claims

The claims do not stand or fall together. For the reasons noted below in the argument section, the claims may be divided into two groups, with the first group including claims 1-9 and the second group including claims 10-12.

(8) Argument

A. The subject matter of claims 10 and 12 is not anticipated by Brown.

Appellant requests reversal of the rejection of claims 10 and 12 as being anticipated by Brown because Brown does not describe or suggest a flexible substrate that "has a concave surface in contact with said plurality of cylindrical rollers and a convex surface opposite to said concave surface," as recited in claim 10. The final action indicates that each of the uppermost wheels on opposite sides of the apparatus of Brown are in contact with a concave surface of the substrate. While this is correct, each of those wheels is in contact with a separate concave surface, and those concave surfaces are separated by a convex surface. Accordingly, Brown does not describe or suggest "*a* concave surface in contact with *said plurality* of cylindrical rollers," as recited in claim 10 (with emphasis added).

The advisory action states that the claims do not prevent the "concave surface" of the claim from constituting two concave surfaces separated by a convex surface. Appellant respectfully disagrees. With emphasis added, claim 10 states that the cylindrical rollers are "arranged along *an* arc" and that the substrate passes along the rollers so that the "substrate is curved so that said substrate has *a* concave surface in contact with said plurality of cylindrical rollers and a convex surface opposite to said concave surface[.]" Thus, the claim recites a single concave surface in contact with rollers that are arranged in a single arc. Nothing in this language contemplates a concave surface in contact with one roller that is separated from a concave surface in contact with another roller by a convex surface in contact with multiple rollers. Such a broad interpretation would render meaningless the recitation of "a concave surface in contact with said plurality of rollers." For at least this reason, the rejection of claim 10 and its dependent claim 12 should be reversed.

B. The subject matter of claims 1-9 would not have been obvious over Brown in view of the admitted prior art and further in view of Misiano.

Appellant requests reversal of the rejection of claim 1 and its dependent claims 2, 8 and 9 because neither Brown, the admitted prior art, Misiano, nor any combination of the three

describes or suggests a flexible substrate that is "in contact with each of the plurality of cylindrical rollers with a wrap angle kept positive to create a force in a direction pressing the flexible substrate against the plurality of cylindrical rollers," as recited in claim 1. The final action attempts to address this failure of the prior art by stating that the arrangement shown in Brown's Fig. 7 is similar to the arrangement claimed, and by arguing that denoting an angle as positive or negative is arbitrary. In doing so, the final action ignores the fundamental aspect of this claim element, which is that the substrate and the rollers are arranged such that the substrate is pressed against the rollers by the wrap angle of the substrate. By contrast, the arrangement in Brown's Fig. 7 tends to pull the substrate away from the rollers and, accordingly, is exactly opposite to what is claimed.

Moreover, absent impermissible hindsight reconstruction of the invention, one of ordinary skill in the art would have had no motivation to combine the references in the manner suggested. The final action asserts that the motivations to combine the references are clearly laid out in the rejections mailed February 10, 2003. Appellant respectfully disagrees.

The rejections mailed February 10, 2003, indicate that it would have been obvious to modify Brown in view of the admitted prior art because the apparatus of the admitted prior art "allows for the suitable plasma treatment of long substrates." As Brown is already directed to the plasma treatment of continuous material, the apparatus of Brown does not lack the ability to treat long substrates and, accordingly, nothing in Brown or the admitted prior art would have led one of ordinary skill in the art to employ the electrodes of the admitted prior art in the system of Brown.

Moreover, nothing in Brown or the admitted prior art would have led one of ordinary skill in the art to put a ground electrode in contact with each of the cylindrical rollers. Indeed, neither Brown nor the admitted prior art describes or suggests such an arrangement.

For each of the reasons discussed above, appellant requests reversal of the rejection of claim 1 and its dependent claims.

Like claim 1, independent claim 3 recites a ground electrode in contact with each of a plurality of cylindrical rollers that are arranged such that a flexible substrate is in contact with

each of the plurality of cylindrical rollers with a wrap angle kept positive to create a force in a direction pressing the flexible substrate against the plurality of cylindrical rollers. Accordingly, appellant requests reversal of the rejection of claim 3 and its dependent claims 4-7 for the reasons noted above with respect to claim 1.

C. The subject matter of claims 10-12 would not have been obvious over Brown in view of the admitted prior art and further in view of Misiano.

As discussed above with respect to the anticipation rejection, Brown fails to describe or suggest a flexible substrate that "has a concave surface in contact with said plurality of cylindrical rollers and a convex surface opposite to said concave surface," as recited in claim 10. Appellant requests reversal of the rejection of claim 10 and its dependent claims 11 and 12 because neither Misiano nor the admitted prior art remedies this failure of Brown. In particular, neither Misiano nor the admitted prior art describes or suggests rollers and a substrate arranged in the manner recited in claim 10.

For the reasons discussed above, all of the rejections should be reversed.

The brief fee of $330 is enclosed along with the extension of time fee of $420. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 5/17/04

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Appendix of Claims

1. (Previously Presented) A film formation apparatus for a flexible substrate, said film formation apparatus comprising:

at least two rollers for continuously conveying the flexible substrate from one end to the other end;

a plurality of cylindrical rollers being provided between the one end and the other end along an arc with a radius R;

a ground electrode in contact with each of the plurality of cylindrical rollers;

an opposing electrode opposing the ground electrode;

a vacuum chamber;

an introducing means for introducing a gas into the vacuum chamber;

a gas evacuation means; and

an energy supplying means for supplying an energy to make a plasma from the gas;

wherein the flexible substrate is located between the ground electrode and the opposing electrode,

wherein center axes of the plurality of cylindrical rollers run parallel to each other,

wherein the substrate is in contact with each of the plurality of cylindrical rollers with a wrap angle kept positive to create a force in a direction pressing the flexible substrate against the plurality of cylindrical rollers,

wherein the ground electrode act as a conveyance supporting portion,

wherein the plurality of cylindrical rollers are provided with a heater.

2. (Original) A devise according to claim 1,

wherein the radius R of the arc is in a range of 0.5 to 10 m.

3. (Previously Presented) A film formation apparatus for a flexible substrate, said film formation apparatus comprising:

at least two rollers for continuously conveying the flexible substrate from one end to the other end;

a plurality of cylindrical rollers being provided between the one end and the other end along an arc with a radius R;

a ground electrode in contact with each of the plurality of cylindrical rollers;

an opposing electrode opposing the ground electrode,

wherein the flexible substrate is located between the ground electrode and the opposing electrode,

wherein center axes of the plurality of cylindrical rollers run parallel to each other,

wherein the substrate is in contact with each of the plurality of cylindrical rollers with a wrap angle kept positive to create a force in a direction pressing the flexible substrate against the plurality of cylindrical rollers,

wherein the ground electrode act as a conveyance supporting portion,

wherein the plurality of cylindrical rollers are provided with a heater.

4. (Original) An apparatus according to claim 3,

wherein the radius R of the arc is in a range of 0.5 to 10 m.

5. (Original) An apparatus according to claim 3 further comprising:

a vacuum chamber;

an introducing means for introducing a gas into the vacuum chamber;

a gas evacuation means; and

an energy supplying means for supplying an energy to make a plasma from the gas.

6. (Original) An apparatus according to claim 3,

wherein the film formation apparatus is a plasma CVD apparatus.

7. (Original) an apparatus according to claim 5,

wherein the energy is an electromagnetic wave.

8. (Previously Presented) An apparatus according to claim 1,

wherein the film formation apparatus is a plasma CVD apparatus.

9. (Previously Presented) An apparatus according to claim 1,

wherein the energy is an electromagnetic wave.

10. (Previously Presented) An apparatus comprising:

a plurality of cylindrical rollers arranged along an arc wherein center axes of the plurality of cylindrical rollers run parallel to each other;

a flexible substrate passing along said plurality of cylindrical rollers wherein said flexible substrate is curved so that said substrate has a concave surface in contact with said plurality of cylindrical rollers and a convex surface opposite to said concave surface; and

an electrode opposed to said plurality of cylindrical rollers with said flexible substrate disposed therebetween.

11. (Previously Presented) The apparatus according to claim 10 wherein said plurality of cylindrical rollers are grounded and said electrode is connected to a high frequency power supply.

12. (Previously Presented) The apparatus according to claim 10 wherein said apparatus is a plasma CVD apparatus.

13. (Withdrawn) A method comprising:

providing a plurality of cylindrical rollers arranged along an arc in a chamber wherein center axes of the plurality of cylindrical rollers run parallel to each other;

providing an electrode opposed to said plurality of cylindrical rollers in said chamber;

moving a flexible substrate from a first roller to a second roller wherein said flexible substrate passes through a space between said plurality of cylindrical rollers and said electrode;

introducing a gas into said chamber; and

applying an electrical energy to said electrode to form a plasma of said gas,

wherein said flexible substrate is curved so that said flexible substrate has a concave surface being in contact with said plurality of cylindrical rollers and a convex surface opposite to said concave surface.

14. (Withdrawn) The method according to claim 13 wherein a film is formed from said plasma.

15. (Withdrawn) The method according to claim 13 wherein said flexible substrate is in contact with said plurality of cylindrical rollers with a wrap angle kept positive.